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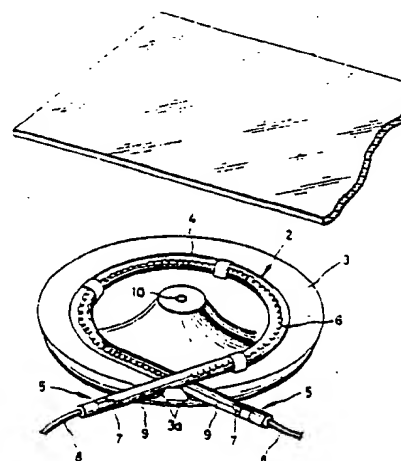
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(54) **COOKING RANGE.**

(57) In a cooking range having a halogen lamp (2) provided as a heat source below a cooking plate (1), and a reflecting member (3) surrounding the outer side portion of the halogen lamp (2), the halogen lamp (2) is bent at its intermediate portion and crossed at its both end portions so as to form a substantially annular portion (4) with sealed portions (5), which are provided at both ends of the halogen lamp, positioned on the outer side of the reflecting member (3). The halogen lamp (2) is crossed at its end portions on the inner side of the reflecting member (3), and a light-emitting member (6) is provided so as to extend substantially from the intersection of these end portions and through the annular portion (4).

FIG. 1



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ABSTRACT

In a heating cooker including a halogen lamp (2) provided below a cooking plate (1) as a heat source and a reflection member (3) surrounding an outside of the halogen lamp (2), an intermedial portion of the halogen lamp (2) is bent such that opposite end portions thereof are crossed to form a substantially annular portion (4) and sealing portions (5) provided in the opposite end portions of the halogen lamp are positioned outside the reflection member (3). Further, the halogen lamp (2) is crossed within the reflection member (3) and a light emissive portion (6) is provided in the annular portion inside the crossed portion.

SPECIFICATION

HEATING COOKER

FIELD OF ART

The present invention relates to a heating cooker using a halogen lamp.

BACKGROUND OF ART

A heating cooker using halogen lamp is well known. Since this heating cooker utilizes electricity and, so, no flame and smoke are produced, it is safe. Since it heats a pan or frying pan directly, it is efficient. Further, it is clean and easily cleaned due to its soot-free nature and has, in addition to an advantage of a heater type cooker that a temperature can be regulated in stepless manner, an advantage of short rising time which can not be obtained with heaters of other types.

A configuration of a bottom portion of almost all of cooking devices is circular and, therefore, a heating portion of a heating cooker should be in the ring form in view of thermal efficiency. However, it has been difficult to make a halogen lamp curved. For this reason, a conventional heating cooker utilizes a plurality of straight halogen lamps arranged in parallel and a circular window portion is formed by a masking plate disposed on a cooking plate.

However, in such heating cooker, it is difficult to heat a cooking device uniformly when the number of halogen lamps is small. Further, when the number of halogen lamps is large, the cooker becomes very expensive although the non-uniform heating is solved.

An object of the present invention is to solve the problems of the conventional cooker mentioned above and to provide a long life heating cooker which utilizes an annular halogen lamp.

Another object of the present invention is to provide a heating cooker in which a light emissive portion of a halogen lamp can be made substantially annular.

DISCLOSURE OF THE INVENTION

The present invention which achieves the above object resides, in a heating cooker having a halogen lamp provided beneath a cooking plate as a heat source and a reflective member surrounding an outer side of the halogen lamp, in that an intermedial portion of the halogen lamp is bent so that opposite end portions thereof are crossed to form a substantially circular, annular portion and that sealing portions at the opposite end portions of the halogen lamp are positioned outside the reflective member.

The present invention which achieve the another object resides in that the halogen lamp is crossed within the reflective member and that the light emissive portion is

provided in an area covering from the crossing position to the side of the annular portion.

BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a disassembled perspective view of main portion of a heating cooker which is an embodiment of the present invention,

Fig. 2 is a cross section of the heating cooker,

Fig. 3 is a plan view of a halogen lamp used in the heating cooker according to the present invention,

Fig. 4 is a disassembled perspective view of another embodiment of the present invention,

Fig. 5 is a cross section showing a portion of the heating cooker in an assembled state.

PREFERRED EMBODIMENTS FOR PRACTICIZING THE INVENTION

The present invention will be described in more detail with reference to the accompanying drawings.

Figs. 1 and 2 show only main portions of an embodiment of a heating cooker according to the present invention for better understanding thereof.

In Figs 1. and 2, a reference numeral 1 depicts a cooking plate of heat resistive glass or the like, 2 a halogen lamp and 3 a reflective member constituted as a reflective plate surrounding an outside of the halogen lamp 2. The halogen lamp 2 has an intermedial portion bent to form a

substantial circular configuration as shown in Figs. 1 and 3, with opposite end portions thereof which are straight being crossed and extended outwardly of the reflective plate 3. That is, the halogen lamp 2 forms an annular portion 4 by crossing its opposite end portions and sealing portions 5 at the respective end portions are positioned outside the reflective plate 3. In this case, the crossing portions of the halogen lamp 2 are within the reflective plate 3 and a filament which is a light emissive portion of the halogen lamp 2 is provided in the annular portion 4 formed between crossing end portions. Further, in this case, a notch 3a is formed in the reflective plate 3, through which the opposite end portions of the halogen lamp extend outwardly.

In each sealing portion 5, a molybdenum foil 7 is provided, to which an outer lead wire 8 and an inner lead wire 9 are connected. The inner lead wire 9 extends from the molybdenum foil 7 to either end of the filament 6. A reference numeral 10 depicts a sensor for sensing temperature of a region near a surface of the cooking plate 1.

Since the sealing portions 5 of the halogen lamp 2 of the heating cooker constructed as above arranged outside the reflective plate 3, it is possible to maintain them at relatively low temperature. Further, it is also possible to cool the sealing portions 5 by air by means of a fan or the like provided in the cooker according to demand. Further, since the crossing position of the halogen lamp 2 is within

the reflection plate 3 and the filament is arranged in only the annular portion 4, red light produced by the halogen lamp 2 in operation and fallen on the cooking plate 1 is in substantially the ring form, improving thermal efficiency thereof and providing a good-looking.

In a case of a heating cooker which utilizes a substantially annular halogen lamp whose sealing portions are arranged within a reflection plate, temperature around a surface of the halogen lamp within the reflection plate in which radiation of the halogen lamp also attributes a heating becomes as high as about 700°C - 800°C .

It is necessary, however, to maintain the sealing portion of the halogen lamp at 350°C or lower and this is defined in the Japanese Industrial Standard. When temperature of the sealing portions of the halogen lamp becomes equal to or higher than this temperature, there is a tendency of occurrence of break-down of filament around molybdenum foils and thus the halogen lamp of the heating cooker tends to be shortened.

Further, since, in the heating cooker, there is no filament is provided in the sealing portions, a light emissive portion of the halogen lamp becomes circular having a portion removed, that is, substantially C-shaped, resulting in no annular configuration.

These problems are solved in the present invention since the sealing portions 5 of the halogen lamp 2 are outside

the reflection plate 3. Further, since the filament 6 of the halogen lamp 2 is provided in the annular portion 4 defined by the crossing portions, red light on the cooking plate 1 becomes substantially annular.

Figs. 4 and 5 are a disassembled perspective view and a cross sectional view of another embodiment of the present invention, respectively.

In Fig. 4, a cooking plate 1 comprises a ultra heat resistive glass ceramic plate 11 and a masking plate 12 and is fixed in a casing 13 of the cooker. A reflection plate 3 comprises a cylindrical side wall 14, a center land portion 15, a pair of support arms 16 extending from the center land portion 15 to the side wall 14 and a bottom plate 17, all of which are formed of a heat insulating material, integrally as a unit. In this embodiment, the reflection plate 3 is formed by molding of ceramic fiber material. A temperature sensor 10 is provided in the center land portion 15.

The side wall 14 is formed with a notch portion 18 and a halogen lamp 2 is supported by the notch portion 18 and receiving grooves 19 formed in the respective support arms 16. In this case, after the halogen lamp 2 is mounted on the reflection plate 3, the notch portion 18 is fitted with a joint piece 20 by which opposite end portions of the halogen lamp 2 are fixedly supported such that they penetrate the side wall 14 with substantially no gap therebetween.

A circular heat insulating plate 21 is attached to a

lower surface of the reflection plate 3 and is formed of a heat insulating material (tradename "MicroTherm") which has a ultra fine porous structure and contains mainly ultra fine silica particles, ceramic fibers and devitrifying agent. An assembly of the reflection plate 3 and the heat insulating plate 21 is received in a dish shaped receiving member 22 which is supported by a bottom cover 24 through a compression spring 23. With this compression spring 23, an upper surface of the reflection plate 3 is urged against the cooking plate 1 and, since the halogen lamp 2 penetrates the side wall 14 with substantially no gap therebetween, an interior of the reflection plate 3 is kept air-tightly.

Since the side portion and the bottom portion of the reflection plate 3 of the heating cooker constructed in this manner are of the heat insulating material and kept air-tightly, heat generated by the halogen lamp 2 is substantially used to heat the cooking plate 1, resulting in further improved heat efficiency. Further, since substantial heat leakage outwardly of the reflection plate 3 becomes hard to occur, the sealing portions 5 of the halogen lamp 2 can be maintained at relatively low temperature, resulting in no need of air cooling means.

CLAIMS

1..(Amended) In a heating cooker including a halogen lamp provided below a cooking plate as a heat source and a reflection member surrounding an outside of said halogen lamp, said heating cooker characterized by that an intermedial portion of said halogen lamp is bent such that opposite end portions thereof are crossed within said reflection member to make said intermedial portion substantially annular, that sealing portions provided in said opposite end portions of said halogen lamp are arranged outside said reflection member and that a light emissive portion is provided in said annular intermedial portion from said crossing portion of said end portions.

2.(Deleted)

3.(Amended) A heating cooker as claimed in claim 1, wherein said reflection member comprises a cylindrical side wall and a bottom plate covering a bottom of said side wall, said side wall and bottom plate being formed of a heat insulating material integrally as a unit.

4. A heating cooker as claimed in claim 3, wherein opposite end portions of said halogen lamp penetrate said side wall of said reflection member with substantially no gap

therebetween.

5. A heating cooker as claimed in claim 3, wherein at least one supporting portions for supporting said annular portion of said halogen lamp is provided by molding in said reflection member integrally with said side wall and said bottom plate.

6. A heating cooker as claimed in claim 3, wherein a heat insulating plate formed of a heat insulating material having a ultra fine porous structure is attached to a lower surface of said reflection member.

7. A heating cooker as claimed in claim 3, wherein a receiving member for receiving an assembly of said reflection plate and said heat insulating plate is supported by a main body of a heat cooker through a spring, and wherein an upper surface of said reflection member is forced against said cooking plate by biasing force of said spring.

8.(Added) The heating cooker as claimed in claim 1, characterized by that said opposite end portions of said halogen lamp are linear, respectively.

FIG. 1

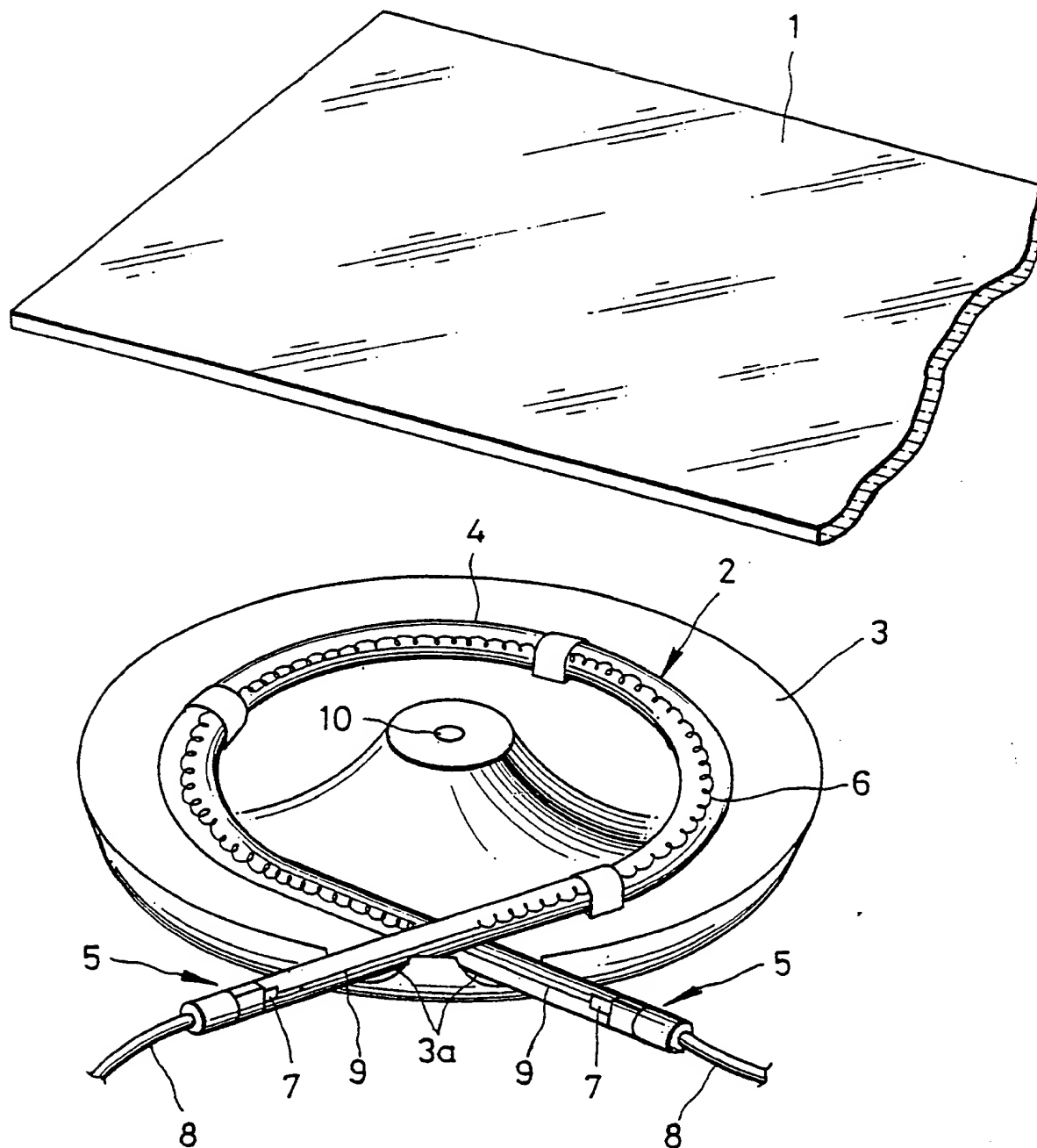


FIG. 2

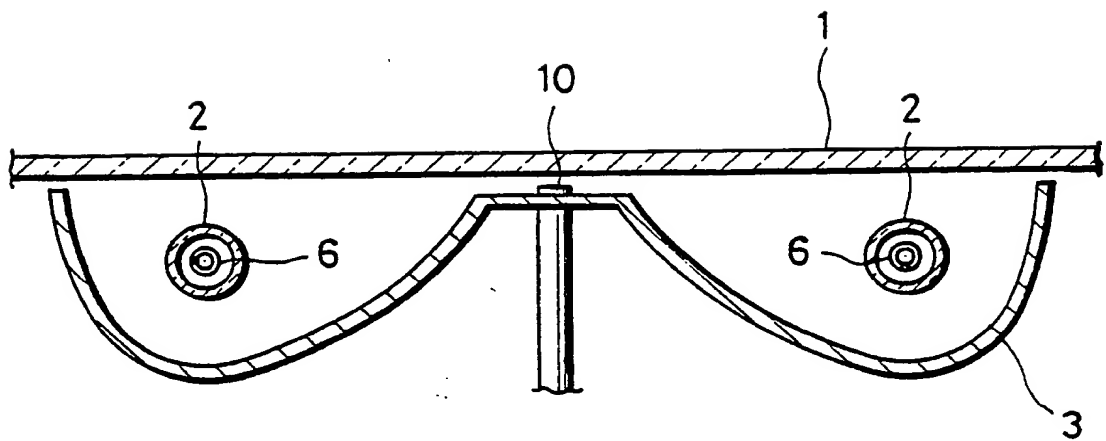


FIG. 3

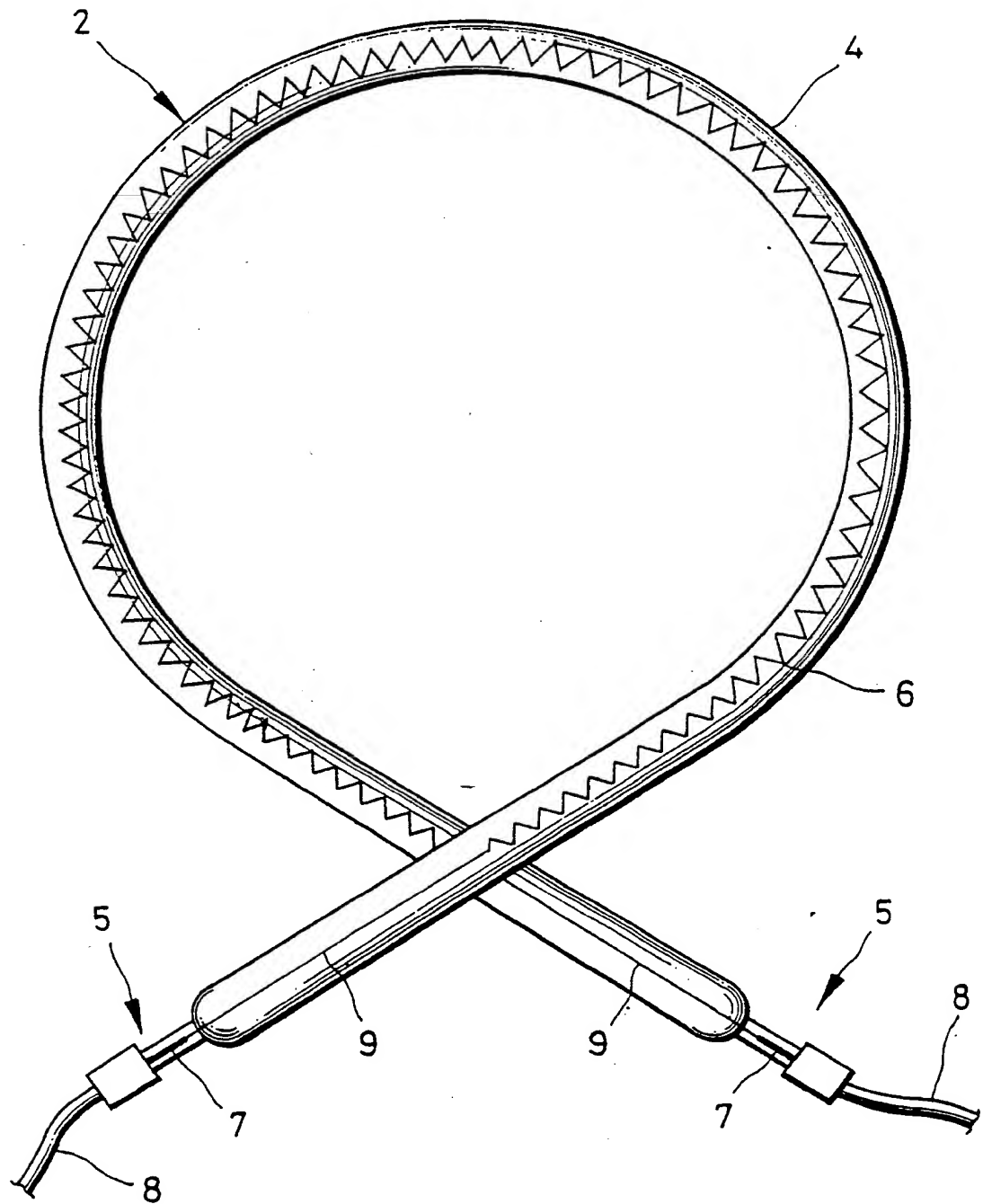


FIG. 4

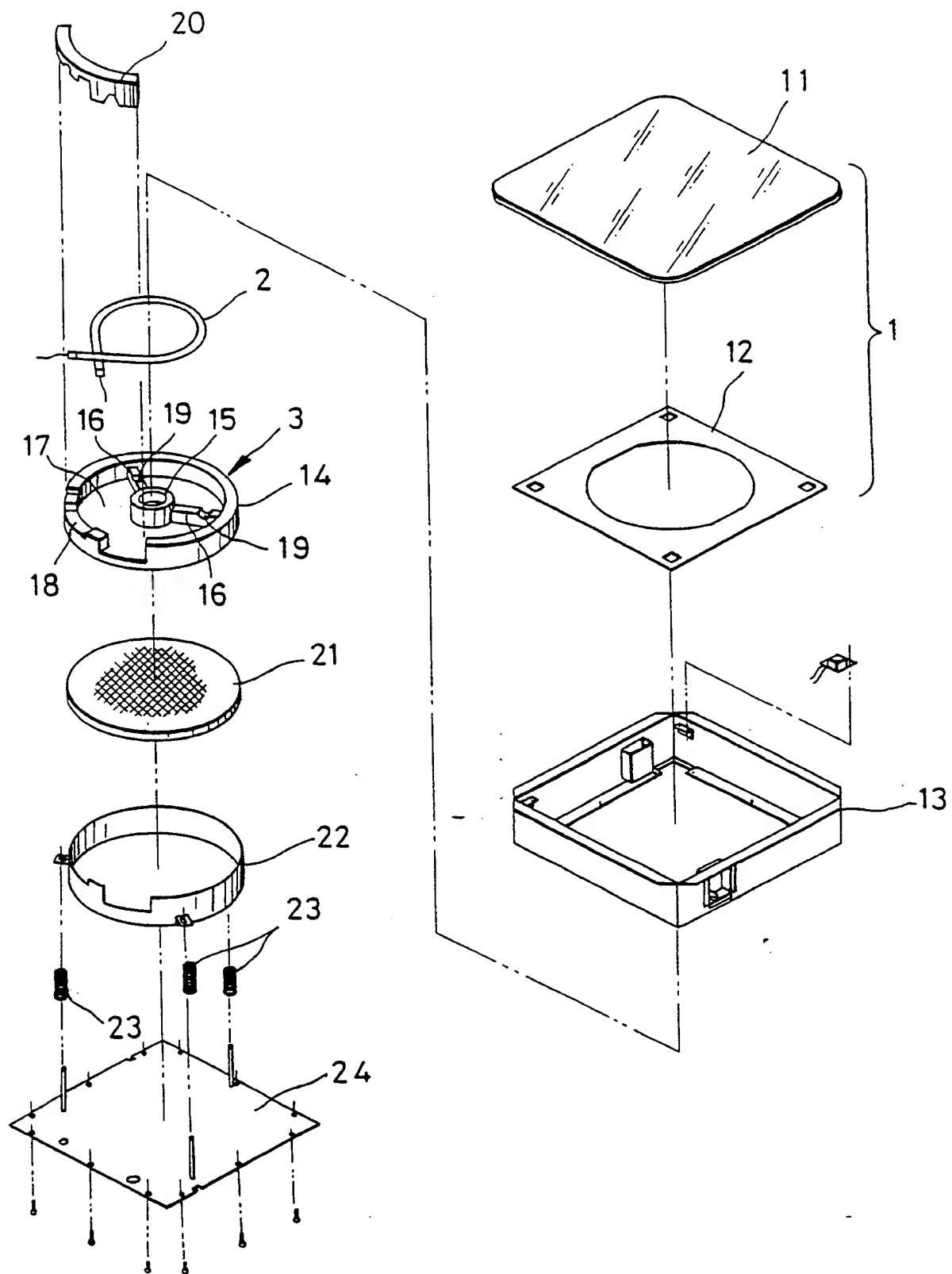
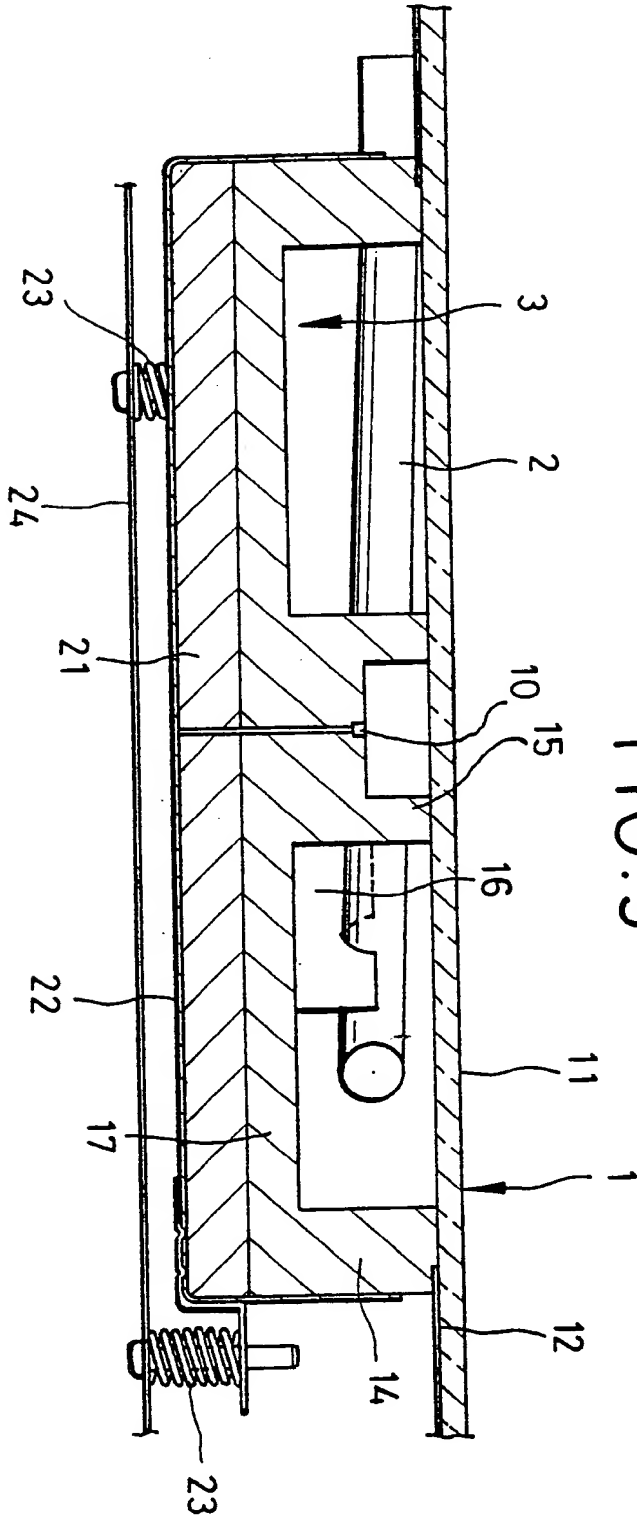


FIG. 5



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP89/00174

I. CLASSIFICATION F SUBJECT MATTER (if several classification symbols apply, indicate all) *						
According to International Patent Classification (IPC) or to both National Classification and IPC						
Int. Cl ⁴	F24C7/04, H05B3/68					
II. FIELDS SEARCHED						
Minimum Documentation Searched :						
Classification System :						
Classification Symbols						
IPC F24C7/04, 7/06, H05B3/68, 3/44, 3/74						
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched :						
<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">Jitsuyo Shinan Koho</td> <td style="width: 40%; text-align: right;">1926 - 1989</td> </tr> <tr> <td>Kokai Jitsuyo Shinan Koho</td> <td style="text-align: right;">1971 - 1989</td> </tr> </table>			Jitsuyo Shinan Koho	1926 - 1989	Kokai Jitsuyo Shinan Koho	1971 - 1989
Jitsuyo Shinan Koho	1926 - 1989					
Kokai Jitsuyo Shinan Koho	1971 - 1989					
III. DOCUMENTS CONSIDERED TO BE RELEVANT *						
Category :	Citation of Document, with indication, where appropriate, of the relevant passages :	Relevant to Claim No. :				
Y	JP, A, 60-194237 (Bosch-Siemens Hausgeräte G.m.b.H.) 2 October 1985 (02. 10. 85), Page 3, upper left column, lines 1 to 4, lower left column, lines 7 to 15, page 4, upper left column, lines 14 to 19, Figs. 1 to 4, & DK, A0, 76785 & GB, A0, 8501135 & SE, A0, 8500811 & PT, A, 69992 & BE, A1, 901415 & DE, C1, 3406604 & DK, A, 76785 & NO, A, 850639 & AU, A1, 3863385 & FR, A1, 2560360 & NL, A, 8500062 & GB, A1, 2155289	1				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> * Special categories of cited documents: " "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: " "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
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IV. CERTIFICATION						
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report				
May 26, 1989 (26. 05. 89)		June 5, 1989 (05. 06. 89)				
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